

Questions from Wall Street Journal February 22, 2014

Question: I also would like to know more broadly what do we know about what happens when a chemical gets into water pipes and what testing/work is being done on this or has been done? I believe this would be part of the EPA's water security work.

Response: USEPA has conducted extensive research and developed numerous programs and products that directly address the technical and logistical issues and challenges associated with drinking water distribution system contamination. A non-technical overview of some of EPA's research in this area can be found in a recent edition of EPA's "Science Matters" newsletter available at <http://www.epa.gov/sciencematters/homeland/index.htm>

A few examples of these products are listed below:

1. Response Protocol Toolbox: This product is comprised of six modules that cover the response to a distribution system contamination incident from initial discovery through remediation. In particular, module 6 provides guidance on decontamination of a contaminated distribution system. The modules have been collectively downloaded 100,000's of times, probably by water utilities, regulators, and other parties with responsibilities during water contamination incidents. <http://water.epa.gov/infrastructure/watersecurity/emerplan/index.cfm#pp8>
2. Water Security Initiative: This program has piloted drinking water contamination warning systems in five cities, and is in the process of developing additional guidance and promoting adoption of these practices throughout the US. <http://water.epa.gov/infrastructure/watersecurity/lawsregs/initiative.cfm>
3. Water Security Toolkit: The Toolkit assists in the evaluation of multiple response actions in order to select the most beneficial consequence management strategy. It includes hydraulic and water quality modeling software and optimization methodologies to identify: (1) sensor locations to detect contamination, (2) locations in the network in which the contamination was introduced, (3) hydrants to remove contaminated water from the distribution system, (4) locations in the network to inject decontamination agents to inactivate, remove, or destroy contaminants, (5) locations in the network to take grab samples to confirm contamination or cleanup, and (6) valves to close in order to isolate contaminated areas of the network. EPA/600/R-13/353, 2014 available at http://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=517400
4. Detection of contaminants in drinking water distribution systems: There are eight categories of detection products which EPA has studied. These are described at <http://www.epa.gov/nhsr/aboutwater.html> which also contains links to specific products within these categories.
5. An overview of EPA's drinking water infrastructure decontamination research is in the file "EPA water decon summary.pptx" This presentation is from the 2013 International Decontamination Research and Development Conference.

6. Decontamination of chemical agents from drinking water infrastructure: A literature review and summary: This is a literature review by USEPA with contributions by Environment Canada. It is a summary of chemical agent persistence on drinking water infrastructure (distribution system and home plumbing). Contains organic chemical data on chlordane, p-dichlorobenzene, parathion, chlorpyrifos, and sodium fluoroacetate. This article is in-prepress in the high-impact factor, international, peer reviewed journal *Environment International*. A corrected proof provided by the journal is in the file "chem scoping report.pdf" There are two other literature reviews in the same upcoming issue that cover radiological and biological contaminants.
7. Chemical Contaminant Persistence and Decontamination in Drinking Water Pipes: This USEPA report presents a standardized persistence and decontamination experimental design protocol that can be used across laboratories to perform drinking water pipe decontamination research. Using the protocol, the report evaluation decontamination alternatives, such as flushing and hyperchlorination, for removal of organic contaminants (sodium fluoroacetate and chlordane) from simulated piping materials, such as cement mortar lined iron and PVC plastic. EPA/600/R-12/514, 2012 available at http://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=506663 This protocol has been utilized by EPA's international collaborators. Results for flushing and hyperchlorination of two organic chemicals (dichlorvos and disulfoton) on simulated cast iron, copper, and PVC pipes were presented at the American Water Works Association Annual Conference (ACE) in June 2012. The presentation is in the file "pipe decon ACE 2012.pdf" Additional work is scheduled to be presented at this year's ACE conference in June 2014.
8. Pilot-scale tests and systems evaluation for the containment, treatment, and decontamination of selected materials from T&E building pipe loop equipment: This USEPA utilized cement-mortar, which is representative of the distribution system. Chemicals include arsenic, mercury and chlordane. EPA/600/R08/016, 2008 available at http://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=498218
9. Persistence and decontamination of surrogate radioisotopes in a model drinking water distribution system: This report presents results from a study that evaluated adhesion and subsequent removal of surrogate radioisotopes, which are non-radioactive chemicals, from drinking water distribution system pipe materials. http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=203591&fed_org_id=1253&address=nhsr/si/&view=desc&sortBy=pubDateYear&showCriteria=1&count=25&searchall='water%20security'%20AND%20decontamination%20AND%20persistence The file "water research rad in water.pdf" contains this report.

Question: Andrew Whelton from the University of Southern Alabama who is working heavily in WV right has said publicly (including today at a press conference in Charleston) that the studies from the EPA did not look specifically at how chemicals stay or can be removed specifically from piping in people's homes. He's saying that this has never been really studied in a civilian context and is critical on the EPA's water security work on this. Can you respond to that and tell me if he's right that this has not been studied or point to any studies that do look at that?

Response: EPA has conducted research relevant to the removal of chemicals from people's homes in the civilian context.

A few examples are:

1. The Reponse Protocol Toolbox mentioned above contains examples of the types of chemicals that are of interest for water security and which may require decontamination after a release. Table 4-1 of Module 4 lists a number of chemicals of interest. Of these, only a few are Chemical Warfare Agents (i.e. military agents). Most of the work including that described both above and below, are based on chemicals of interest for civilian release scenarios.
2. USEPA collaborated with the National Institute of Standards and Technology (NIST) on a study that evaluated contaminant accumulation and subsequent decontamination of premise plumbing systems (i.e., "plumbing in people's homes"). The results from this study were published in September 2009 and can be found at:
http://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=506685 which is the final report from the study. NIST also published as "NIST Technical Note 2009-1652" in 2009, which published some initial recommendations for building plumbing system decontamination
http://www.nist.gov/manuscript-publication-search.cfm?pub_id=861645
3. USEPA has investigated the effect of sediments in water storage tanks relative to their ability to interact with contaminants, therefore potentially prolonging the persistence of the contaminant in the water system, whether that be the municipal distribution system, a private residence, or building. A final report is upcoming, but preliminary results have been reported in presentations at American Water Association conferences. The latest is called "EPA DSEP conference Sept 2013.ppt"
4. The studies in the responses to the first question highlighted above have involved studies with a number of pipe materials, including those used in residential and building plumbing. Thus, these results are applicable to people's homes.
5. The studies mentioned in the responses to this question and the previous are selected examples of EPA's work in this area over the past dozen year. Other products are available, and others are in progress. Please note that these studies represent a balance between looking at end-to-end decontamination of the water system, not just in the public water supply distribution system, but also in the smaller, but much more numerous "distribution systems" in people's home and other buildings. To further broaden EPA's capabilities to be responsive to the wide range of potential contamination scenarios, they also represent a balance between chemical, biological, and radiological contaminants.